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A NEW SPECIES OF *AULODRILUS* BRETSCHER (OLIGOCHAETA: TUBIFICIDAE) FROM NORTH AMERICA

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Abstract.—*Aulodrilus paucichaeta,* new species, differs from other members of the genus in having no hair or palmate chaetae and no lateral expansions on the bifid chaetae. The chaetae of this species are fewer in number and more robust than those of other species. It is larger in size than the other members of the genus but the reproductive system is clearly that of an *Aulodrilus.* Somatic characters of *A. paucichaeta* superficially resemble those of *Isochaetides curvisetosus,* and it is regarded as distinct from *I. hamata,* which was inadequately described and is best retained as a species inquirenda.

Some years ago the second author collected some unusual tubificid specimens from freshwater tidal marshes in Piscataway Creek, Maryland, a tributary of the Potomac River, downriver of Washington, D.C. These worms resembled members of the genus *Aulodrilus,* but as the reproductive systems of species in that genus badly needed redescription, it was impossible to be sure of the generic status of the material. Since that time, the male ducts of *Aulodrilus* species have been described by Giani et al. (1984), and it is clear that the new material does, in fact, belong in that genus despite its unusually large size and the robust form of the chaetae. Additional material collected in North Carolina has also been examined which, while immature, closely resembles this species.

Methods and Materials

Specimens were whole mounted in Canada balsam apart from two that were serially sectioned, stained, and mounted in Canada balsam. Two of the whole mounted worms were dissected; the head and tail of a third was preserved in alcohol, but is now missing. Four specimens remain in alcohol.

Aulodrilus paucichaeta, new species

Fig. 1

Holotype.—USNM 098228, a slide-mounted specimen.

Type-locality.—Freshwater marshes near the confluence of Piscataway Creek and the Potomac River, Maryland, downriver of Washington, D.C. Substrate of sand and detritus, with varying amounts of silt and clay, 3 Oct 1979.

Paratypes.—USNM 098229-36, 12 mature and 1 immature specimens, 4 mounted whole on separate slides, 3 dissected and mounted on separate slides, 2 specimens sectioned and mounted on 2 slides each (one of which was destroyed in the mail), 4 preserved whole in alcohol.—Barbour collection, 2 mature and 1 immature specimens on 1 slide, from the type-locality, 18 Jun 1984.—Brinkhurst collection, 1 mature whole mounted specimen from the type-locality, 4 Sep 1984.

Other material.—6 whole mounted immature specimens probably attributable to this species, State of North Carolina Department of Natural Resources and Community Development, D. Lenat collection, Mill Creek near Sneads Ferry, Onslow Co., Feb 1984;—Reedy Branch, Faison, Duplin Co., Mar 1982;—Chowan River, Riddicksville, Herford Co., Aug 1982;—Swift Creek, Hilliardston, Nash Co., Aug 1982;—Sandy Creek, Stedman, Cumberland Co., May 1981. All from coastal plains streams, most with a low pH.

Etymology.—Worm with few chaetae; the specific epithet being used as a noun in apposition.

Description.—Large worms, more than 50 mm long by 1 mm broad even with tail missing (preserved, mounted and flattened specimens), more than 100 segments. Anterior chaetal bundles with 2–3 chaetae each, upper teeth shorter and thinner than lower; chaetae progressively increasing in size from II to IX, usually only 2 per bundle from VI to IX, ventral chaetae missing on mature specimens on IX–X, postclitellar chaetae single (4 per segment) with thick recurved lower teeth. Spermathecal pores lateral in position and one-third back from anterior edge of X, male pores prominant in chaetal line ventrally on XI. Spermathecae spherical, largely filling X, with no detectable ducts; filled with sperm in bundles on mated specimens. Male ducts with large funnels, vasa deferentia at least 2.4 mm long by 0.3 mm wide (dissected specimen) from atrium to ovary, close to (broken off) sperm funnel. Vasa deferentia enter atria apically, close to moderate-sized prostates. Atria small, intimately associated with large, spherical, muscular penial bulbs. Penes wedge-shaped, or almost spherical in whole mounts, enclosed in voluminous penis sacs opening to exterior via broad pores with raised medial edges. Sperm sacs and egg sacs to XIII or XIV. Blood vessels closely coiled in III–V, enlarged blood vessels in VII–IX and especially VIII, closely coiled to XI.

Habitat.—Freshwater marsh but tidally influenced; wetland vegetation diverse but dominated by spatterdock (*Nuphar luteum*) and wild rice (*Zizania aquatica*). Substrate sandy, but with varying amounts of silt and clay and detritus. Perhaps also found in coastal plains sandy streams, mostly with low pH.

Distribution.—Known from the type-locality near Washington, D.C. and probably from North Carolina.

Remarks.—The chaetae of *A. paucichaeta* differ from those of all other species in the genus. This species of *Aulodrilus* lacks hair chaetae as do *A. limnobius* and *A. americanus*. However, *A. limnobius* has up to 10 chaetae per bundle anteriorly, and all the chaetae are small, bifid with reduced upper teeth and bear lateral flanges; *A. americanus* also has up to 10 chaetae per bundle, and has simple pointed chaetae anteriorly and palmate chaetae posterior to VI.

Members of the genus *Aulodrilus* are known to reproduce asexually by fragmentation. Fragmentation appears to be more common in *Aulodrilus* found in temperate regions than in those found in warmer or more tropical climates. Fragmentation may be a compensatory mechanism for less favorable conditions and therefore be influenced by temperature. Sexual maturity in *Aulodrilus* would occur in optimal conditions. It is not known whether *A. paucichaeta* is able to reproduce via fragmentation. Mature individuals of *A. paucichaeta* were not numerous but were found in the months of May, June, and September.

The male ducts of *A. paucichaeta* are similar to those described for all the other species in the genus by Giani et al. (1984). The atria are small, the penis sacs

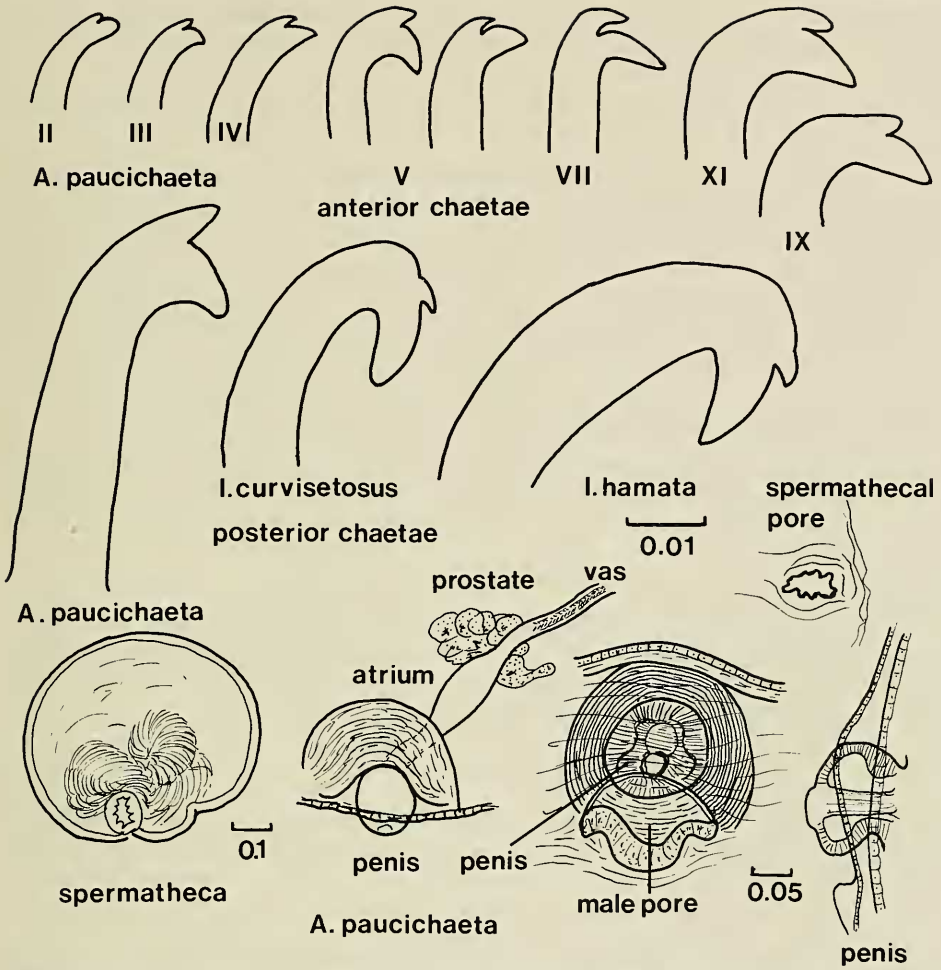

Fig. 1. *Aulodrilus paucichaeta* chaetae and reproductive organs, with posterior chaetae of *Isochaetides curvisetosus* and *I. hamata.*

are large and muscular, and the penes lack cuticular sheaths. The prostate glands are lobed and attached to the atria at one point, and the prostates are not obviously stalked as in most other members of the subfamily Tubificinae. The sperm in the spermathecae of both this species and the other members of the genus *Aulodrilus* are in bundles rather than in spermatozeugmata, which again indicates a degree of separation of this genus from the other tubificines. This characteristic, along with the lack of a cuticular penis sheath and the less clearly stalked prostates may all be taken to be plesiomorphic conditions of these characters, and may suggest that *Aulodrilus* represents a very early descendent of the ancestral tubificine. Giani et al. (1984) discuss these characters in more detail and contend that these characters are not sufficiently different to prevent the merging of the subfamily Aulodrilinae within the Tubificinae.

The only species that could cause any confusion to biologists attempting to identify this species with dichotomous keys would be *Isochaetides curvisetosus*

(Brinkhurst and Cook, 1966). Mature specimens of *I. curvisetosus* differ in having spermathecal chaetae in the ventral bundles of X, and while the ventral chaetae behind approximately XXV are solitary with large lower teeth, they are more strongly recurved than those of the new species, and are accompanied by smaller dorsal chaetae. The description of *I. curvisetosus* in Brinkhurst and Jamieson (1971) is confused by a typographical error that resulted in a line of text being omitted from the manuscript. The chaetae of the species inquirenda *I. hamata* (Moore, 1905) are identical to those of *I. curvisetosus,* and the possibility that these are synonymous has been discussed in the past literature (Brinkhurst and Wetzel 1984). M. S. Loden and W. T. Wassell (pers. comm.) have indicated that the drawings of the male ducts of the type-specimen of *I. curvisetosus* are accurate, but the ejaculatory ducts may have been stretched during dissection, as they appear narrow relative to the atria in a way that differs in other material Loden and Wassell have examined. *Aulodrilus paucichaeta* has male ducts in which the atria taper imperceptibly into the ejaculatory ducts, and the penis sacs are small globular structures at the termination of the ducts. The original description of the penes in *I. hamata* suggests exceedingly long penes but the drawings were said to be diagrammatic and based on partially mature worms (Moore 1905). However, even if there was an error in the description of the penes in *I. hamata,* M. S. Loden has pointed to other significant differences in the blood vascular and digestive system that would prevent him from accepting this synonymy. It seems preferable therefore, to leave *I. hamata* as an inadequately known species unless it is rediscovered, the remaining types all being immature.

Acknowledgments

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